ASSOCIATION BETWEEN CIGARETTE CONSUMPTION, TAR DELIVERY, RESPIRATORY SYMPTOMS, AGE AND RESPIRATORY FUNCTION. T.W. Higenbottam, T.J.H. Clark, M. Shipley, G. Rose. Guy's Hospital and the London School of Tropical Medicine and Hygiene, England.

A cross-sectional study of respiratory symptoms, age, smoking history and respiratory function has been carried out in 18,403 male civil servants aged 40-64 years (Reid et al, 1974). The data was obtained during a large screening study which included questions on smoking habit and respiratory symptoms as well as measurements of FEV1.0 and FVC. 68% had no symptoms. The commonest symptom was chronic expectoration, whose frequency was related to cigarette consumption. As an isolated symptom dyspnoea was rare (less than 2%) and was unrelated to cigarette consumption. Our analysis did not identify subjects with substantial asymptomatic loss of lung function. Smoking and total daily tar delivery were associated with a lower FEV1.0. The average reduction (about 0.5 litre) was independent of age or the presence of symptoms. However, symptom prevalence and fall in FEV1.0 were greatest in those smoking cigarettes with the highest daily tar yields. Our results show that the major effect of smoking is to produce a small decline in FEV1.0 with production of sputum as the most common symptom. Lower tar cigarettes appear to minimise these harmful effects at any level of cigarette consumption.

Reference: Reid et al, Lancet (1974) 1, 469-473.

SUBMAXIMAL EXERCISE TESTING IN COAL MINERS. T.K. Hodous, B.A. Boehlecke, J.L. Hankinson, and J.A. Merchant. Appalachian Laboratory for Occupational Safety and Health, Morgantown, WV.

Fifty-six coal miners and 31 controls performed progressive submaximal bicycle ergometer exercise tests to determine if pulmonary impairment not found with resting pulmonary function tests could be detected. Fourteen miners had chest roentgenograms classified as Category 0/0 for pneumoconiosis (ILO U/C 1971 Classification), 25 as Category 0/1, and 17 as ≥ Category 1/0. Heart rate (HR), respiratory rate, tidal volume (VT), ventilation ($\dot{V}$), and minute oxygen consumption ($\dot{V}O2$) were monitored continuously. At a $\dot{V}O2$ of 1.0 L/min, the miners had significantly ($p < .05$) lower ventilation ($\dot{V}1.0$), and ($p < .1$) heart rate (HR1.0) than the controls despite being older and heavier. They also had a lower tidal volume at a ventilation of 30 L/min (VT30) despite having a lower ratio of FEV1 to FVC on resting spirometry. Miners and controls had normal mean single breath diffusing capacity (DLCO), 102% and 105% of predicted, respectively, and exercise parameters (VT30, $\dot{V}1.0$, HR1.0) did not correlate with resting spirometry values or DLCO in either group. There was no significant difference in any parameter among the three roentgenographic categories of miners, and type of opacities (p or q) had no correlation with resting or exercise results. Comparison of 22 controls and 15 miners who reached $\dot{V}O2$ of 1.5 L/min showed significantly lower HR1.5, $\dot{V}1.5$, and VT30 in the miners. We conclude that submaximal bicycle exercise with non-invasive monitoring has no advantage over resting measurements in detecting pulmonary impairment in early stages of coal workers' pneumoconiosis. The exercise differences between miners and controls may be explained by better cardiovascular fitness of the miners.

	n	AGE(yrs)	WT(lbs)	FEV1/FVC,%	VT30(l)	$\dot{V}$1.0(l/min)	HR1.0(/min)*
Miners	56	55.1±7.9	186±31	69.3±8.6	1.16±.18	24.4±3.8	106±16
Controls	31	46.4±9.3	173±18	78.9±6.9	1.47±.24	26.5±5.0	112±12

Values = group means ± 1 SD; differences significant $p < .05$ (except * $p < .1$ level)

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